

# DATA SHEET

For a complete data sheet, please also download:

- The IC06 74HC/HCT/HCU/HCMOS Logic Family Specifications
- The IC06 74HC/HCT/HCU/HCMOS Logic Package Information
- The IC06 74HC/HCT/HCU/HCMOS Logic Package Outlines

## **74HC/HCT541** Octal buffer/line driver; 3-state

Product specification  
File under Integrated Circuits, IC06

December 1990

## Octal buffer/line driver; 3-state

## 74HC/HCT541

## FEATURES

- Non-inverting outputs
- Output capability: bus driver
- I<sub>CC</sub> category: MSI

The 74HC/HCT541 are octal non-inverting buffer/line drivers with 3-state outputs. The 3-state outputs are controlled by the output enable inputs  $\overline{OE}_1$  and  $\overline{OE}_2$ . A HIGH on  $\overline{OE}_n$  causes the outputs to assume a high impedance OFF-state.

The "541" is identical to the "540" but has non-inverting outputs.

## GENERAL DESCRIPTION

The 74HC/HCT541 are high-speed Si-gate CMOS devices and are pin compatible with low power Schottky TTL (LSTTL). They are specified in compliance with JEDEC standard no. 7A.

## QUICK REFERENCE DATA

GND = 0 V; T<sub>amb</sub> = 25 °C; t<sub>r</sub> = t<sub>f</sub> = 6 ns

SYMBOL	PARAMETER	CONDITIONS	TYPICAL		UNIT
			HC	HCT	
t <sub>PHL</sub> / t <sub>PLH</sub>	propagation delay A <sub>n</sub> to Y <sub>n</sub>	C <sub>L</sub> = 15 pF; V <sub>CC</sub> = 5 V	10	12	ns
C <sub>I</sub>	input capacitance		3.5	3.5	pF
C <sub>PD</sub>	power dissipation capacitance per buffer	notes 1 and 2	37	39	pF

## Notes

1. C<sub>PD</sub> is used to determine the dynamic power dissipation (P<sub>D</sub> in μW):

$$P_D = C_{PD} \times V_{CC}^2 \times f_i + \sum (C_L \times V_{CC}^2 \times f_o) \text{ where:}$$

f<sub>i</sub> = input frequency in MHz

f<sub>o</sub> = output frequency in MHz

∑ (C<sub>L</sub> × V<sub>CC</sub><sup>2</sup> × f<sub>o</sub>) = sum of outputs

C<sub>L</sub> = output load capacitance in pF

V<sub>CC</sub> = supply voltage in V

2. For HC the condition is V<sub>I</sub> = GND to V<sub>CC</sub>  
For HCT the condition is V<sub>I</sub> = GND to V<sub>CC</sub> – 1.5 V

## ORDERING INFORMATION

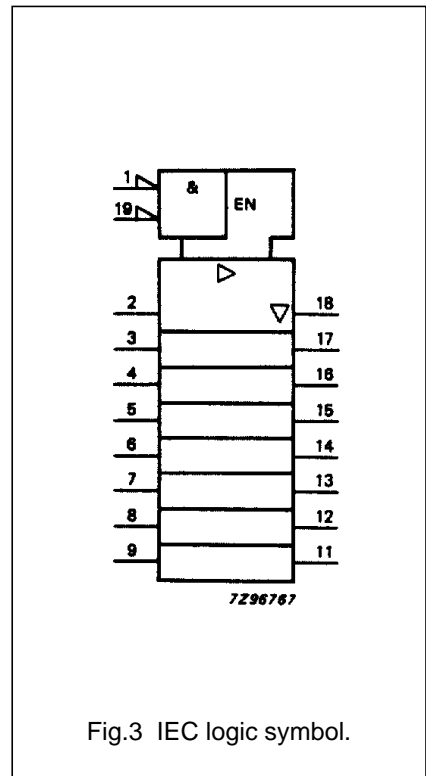
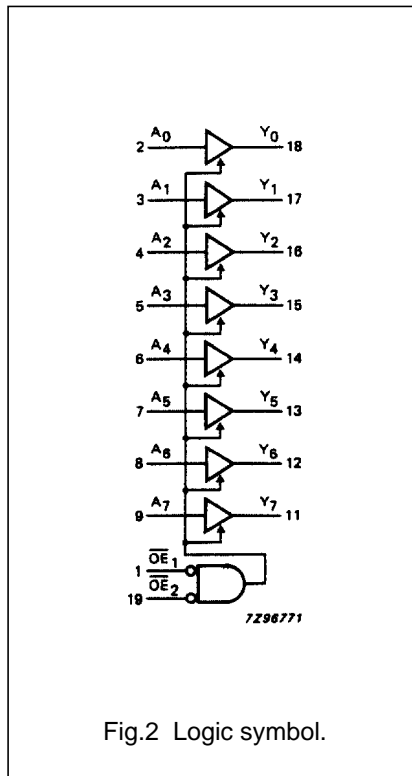
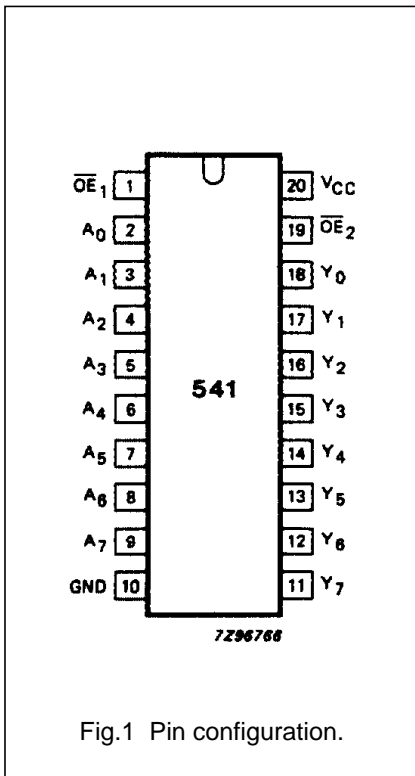
See "74HC/HCT/HCU/HCMOS Logic Package Information".

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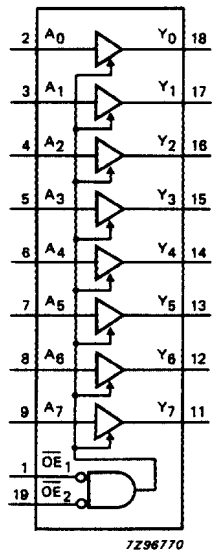
PIN DESCRIPTION

PIN NO.	SYMBOL	NAME AND FUNCTION
1, 19	$\overline{OE}_1, \overline{OE}_2$	output enable input (active LOW)
2, 3, 4, 5, 6, 7, 8, 9	A <sub>0</sub> to A <sub>7</sub>	data inputs
10	GND	ground (0 V)
18, 17, 16, 15, 14, 13, 12, 11	Y <sub>0</sub> to Y <sub>7</sub>	bus outputs
20	V <sub>CC</sub>	positive supply voltage



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Fig.4 Functional diagram.

FUNCTION TABLE

INPUTS			OUTPUT
$\overline{OE}_1$	$\overline{OE}_2$	$A_n$	$Y_n$
L	L	L	L
L	L	H	H
X	H	X	Z
H	X	X	Z

Notes

1. H = HIGH voltage level  
 L = LOW voltage level  
 X = don't care  
 Z = high impedance OFF-state

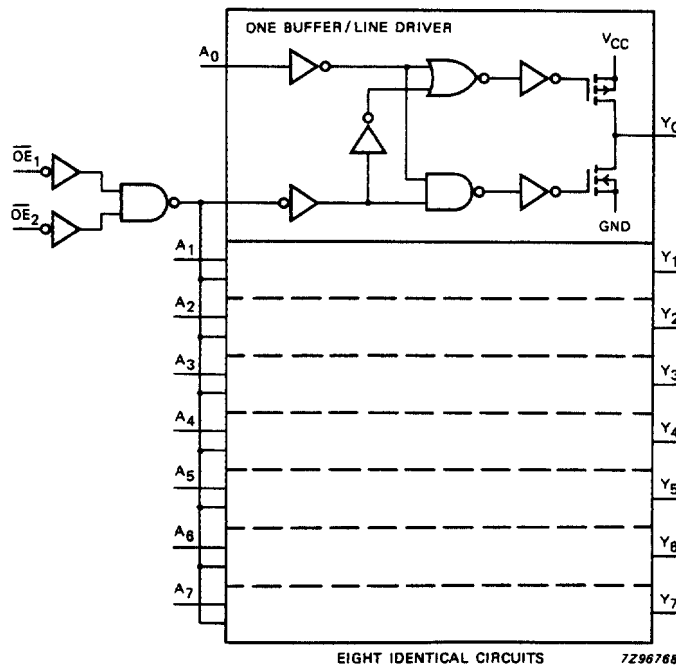


Fig.5 Logic diagram.

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**DC CHARACTERISTICS FOR 74HC**

For the DC characteristics see *"74HC/HCT/HCU/HCMOS Logic Family Specifications"*.

Output capability: bus driver

I<sub>CC</sub> category: MSI

**AC CHARACTERISTICS FOR 74HC**

GND = 0 V; t<sub>r</sub> = t<sub>f</sub> = 6 ns; C<sub>L</sub> = 50 pF

SYMBOL	PARAMETER	T <sub>amb</sub> (°C)							UNIT	TEST CONDITIONS	
		74HC								V <sub>CC</sub> (V)	WAVEFORMS
		+25			-40 to +85		-40 to +125				
		min.	typ.	max.	min.	max.	min.	max.			
t <sub>PHL</sub> / t <sub>PLH</sub>	propagation delay A <sub>n</sub> to Y <sub>n</sub>		33	115		145		175	ns	2.0	Fig.6
			12	23		29		35			
			10	20		25		30			
t <sub>PZH</sub> / t <sub>PZL</sub>	3-state output enable time OE to Y <sub>n</sub>		55	160		200		240	ns	2.0	Fig.7
			20	32		40		48			
			16	27		34		41			
t <sub>PHZ</sub> / t <sub>PLZ</sub>	3-state output disable time OE to Y <sub>n</sub>		61	160		200		240	ns	2.0	Fig.7
			22	32		40		48			
			18	27		34		41			
t <sub>THL</sub> / t <sub>TLH</sub>	output transition time		14	60		75		90	ns	2.0	Fig.6
			5	12		15		18			
			4	10		13		15			

## Octal buffer/line driver; 3-state

## 74HC/HCT541

**DC CHARACTERISTICS FOR 74HCT**

For the DC characteristics see *"74HC/HCT/HCU/HCMOS Logic Family Specifications"*.

Output capability: bus driver

I<sub>CC</sub> category: MSI

**Note to HCT types**

The value of additional quiescent supply current ( $\Delta I_{CC}$ ) for a unit load of 1 is given in the family specifications.

To determine  $\Delta I_{CC}$  per input, multiply this value by the unit load coefficient shown in the table below.

INPUT	UNIT LOAD COEFFICIENT
$\overline{OE}_1$	1.50
$\overline{OE}_2$	1.00
$A_n$	0.70

**AC CHARACTERISTICS FOR 74HCT**

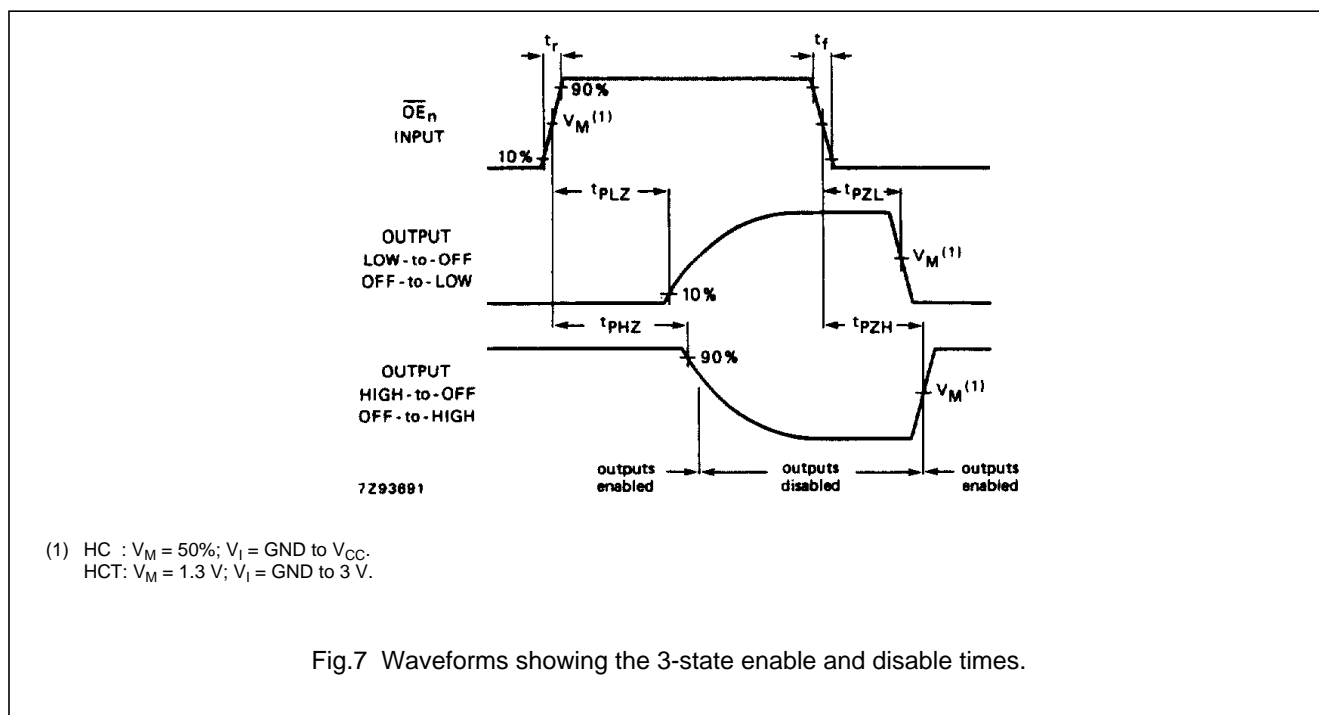
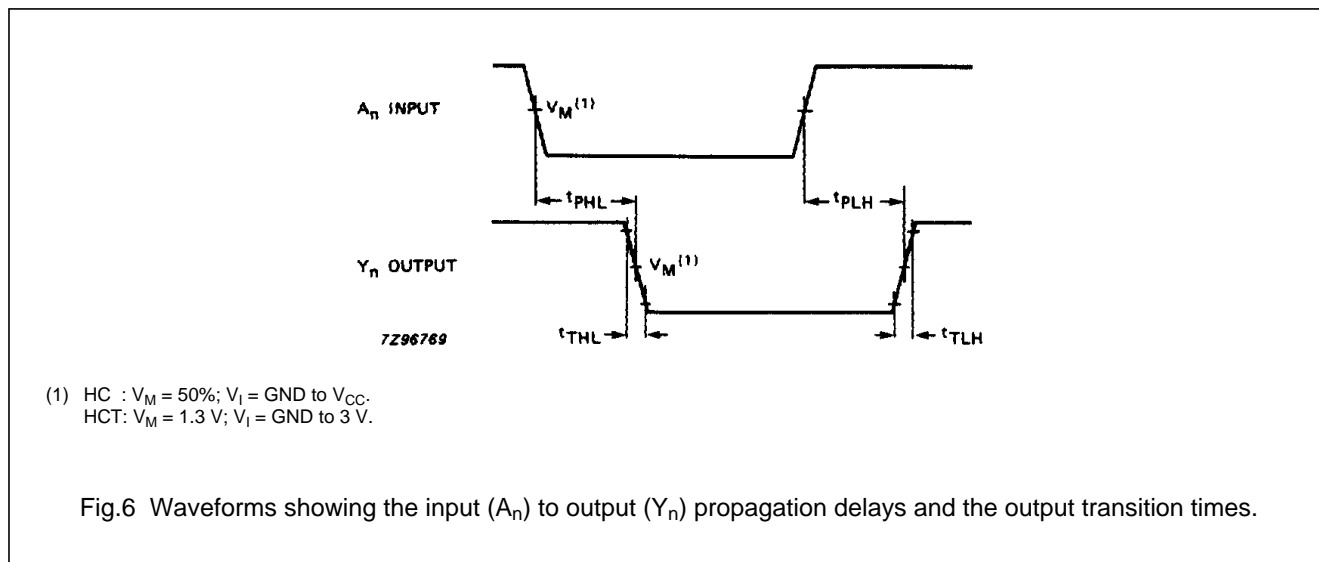
GND = 0 V;  $t_r = t_f = 6$  ns;  $C_L = 50$  pF

SYMBOL	PARAMETER	T <sub>amb</sub> (°C)							UNIT	TEST CONDITIONS	
		74HCT								V <sub>CC</sub> (V)	WAVEFORMS
		+25			-40 to +85		-40 to +125				
		min.	typ.	max.	min.	max.	min.	max.			
t <sub>PHL</sub> / t <sub>PLH</sub>	propagation delay A <sub>n</sub> to Y <sub>n</sub>		15	28		35		42	ns	4.5	Fig.6
t <sub>PZH</sub> / t <sub>PZL</sub>	3-state output enable time $\overline{OE}$ to Y <sub>n</sub>		21	35		44		53	ns	4.5	Fig.7
t <sub>PHZ</sub> / t <sub>PLZ</sub>	3-state output disable time $\overline{OE}$ to Y <sub>n</sub>		21	35		44		53	ns	4.5	Fig.7
t <sub>THL</sub> / t <sub>TLH</sub>	output transition time		5	12		15		18	ns	4.5	Fig.6

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AC WAVEFORMS



PACKAGE OUTLINES

See "74HC/HCT/HCU/HCMOS Logic Package Outlines".